Eclampsia in the United Kingdom

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Abstract

***Objectives*—To measure the incidence of eclampsia, establish how often it is preceded by signs of pre-eclampsia, document the morbidity associated with eclampsia, and determine the maternal case fatality rates.**

***Design*—A prospective, descriptive study of every case of eclampsia in the United Kingdom in 1992. Information was collected from reviews of hospital case notes and questionnaires to general practitioners.**

***Setting*—All 279 hospitals in the United Kingdom with a consultant obstetric unit.**

***Results*—Obstetricians and midwives notified 582 possible cases, and 383 were confirmed as eclampsia. The national incidence of eclampsia was 4·9/10 000 maternities (95% confidence interval 4·5 to 5·4). Most convulsions occurred despite antenatal care (70%) and within one week of the woman's last visit to a doctor or midwife (85%). Three quarters of first seizures occurred in hospital, of which 38% developed before both proteinuria and hypertension had been documented. Forty four per cent of cases occurred postpartum, more than a third (38%) antepartum, and the remainder (18%) intrapartum. Nearly one in 50 women (1·8%) died, and 35% of all women had at least one major complication. The rate of stillbirths and neonatal deaths was 22·2/1000 and 34·1/1000, respectively. Preterm eclampsia occurred more commonly antepartum and was associated with more maternal complications and fetuses that were small for gestational age, as well as with higher rates of stillbirth and neonatal mortality. Antepartum eclampsia, which was more likely to occur preterm, was associated with a higher rate of maternal complications and a higher neonatal mortality. Both factors (gestational prematurity and antepartum occurrence) contributed independently to the severity of the outcome.**

***Conclusion*—Eclampsia occurs in nearly one in 2000 maternities in the United Kingdom and is associated with high maternal morbidity and fatality in cases. It may present unheralded by warning signs. Preterm and antenatal eclampsia seem to be particularly severe.**

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Introduction

Eclampsia is the occurrence of convulsions in association with the signs and symptoms of pre-eclampsia. The syndrome of pre-eclampsia can affect all maternal organ systems, but it is usually detected by the presence of new hypertension, proteinuria, and oedema in pregnancy.[1] Those involved in obstetric care in the United Kingdom deal with pre-eclampsia daily but may perceive eclampsia as a problem of the past now limited to developing countries. In fact eclampsia is still a major cause of maternal mortality in the United Kingdom and has been since the 1950s.[2]

There are no systematically collected population based data that allow the incidence of eclampsia or the morbidity and mortality associated with it to be measured. The only previous national study of eclampsia was conducted in 1922,[3] before the advent of routine antenatal screening. The British eclampsia survey was conducted in 1992 to redress this dearth of information. The aims were to measure the incidence of eclampsia and its maternal and perinatal mortality.[4]

Methods

A protocol detailing the aims and methodology of the study was sent to every local research ethics committee in the United Kingdom, and in all cases when formal approval was deemed to be necessary it was sought and obtained. The Royal College of Obstetricians and Gynaecologists, the Royal College of Midwives, and the Royal College of General Practitioners all formally approved the protocol and encouraged their members to participate.

Requests for notifications of any case of possible eclampsia or unexplained seizure occurring antenatally, intrapartum, or in the first 10 days postpartum during 1992 were sent every three months to all 1011 consultant obstetricians in the United Kingdom and a midwife contact at each of the 279 hospitals with an obstetric unit. A reply was requested whether or not there was a case to be reported, and reminders were sent to non-responders six weeks later. After the notification a photocopy of the woman's entire hospital case notes was sent to us after identifying data had been removed. A detailed review of the case notes was then completed by one of us (KAD), and cases were included if they met the criteria outlined below.

Eclampsia was defined as the occurrence of convulsions during pregnancy or in the first 10 days postpartum together with at least two of the following features within 24 hours after the convulsions: hypertension (a booking diastolic pressure of <90 mm Hg, a maximum diastolic of $\geqslant 90$ mm Hg, and a diastolic increment of $\geqslant 25$ mm Hg[5]); proteinuria (at least + protein in a random urine sample or $\geqslant 0{\cdot}3$ g in a 24 hour collection); thrombocytopenia (platelet count of less than 100×10^9/l); or an increased plasma aspartate transaminase concentration ($\geqslant 42$ IU/l).

Data were collected on antepartum and intrapartum care, the eclamptic episode, and maternal and perinatal outcomes. Antenatal care was assessed relative to a typical pattern of a booking visit before 20 weeks' gestation, monthly visits until 30 weeks, fortnightly visits until 36 weeks, and weekly visits thereafter. Care that did not conform to this pattern did not necessarily imply substandard care.

The gestational age at the time of seizure was recorded, and for postpartum seizures this was taken to be the gestational age at delivery. Eclampsia was defined as unheralded if the woman was in hospital and did not have established proteinuria and hypertension before the fit, although these signs then had to be documented in the first 24 hours afterwards. Maternal

complications were defined as those recorded in hospital case notes and were classified as major (for example, disseminated intravascular coagulopathy, renal failure, cerebrovascular accident) or minor (for example, infection of urinary tract or lower respiratory tract).

General practitioners were sent a questionnaire about antenatal care, maternal puerperal morbidity, and neonatal outcome. Posteclamptic morbidity was assessed by general practitioners reporting if they had seen the woman and if any of 16 listed factors had been an issue during consultation.

Denominator data for live births and stillbirths in the United Kingdom were obtained from the Office of Population Censuses and Surveys for England and Wales, the report of the general registrar of Scotland, and from the office of the general registrar for Northern Ireland. A maternity denotes a pregnancy which resulted in a stillbirth or live birth. A stillbirth refers to a child born after the 24th week of pregnancy without any sign of life. Fetuses were classified as small for gestational age if their birth weights were less than the 10th centile for their gestational age by using charts based on Oxford data.[6]

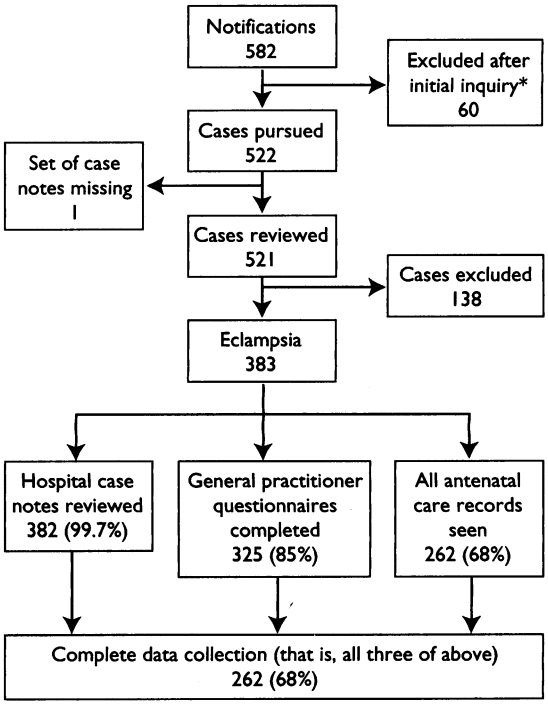
Means (SD) are given for continuous variables. Groups of continuous variables were compared by using the Kruskal-Wallis test for two groups. Confidence intervals for rates were calculated. Further statistical analyses utilised χ^2 test with Yates's correction, Fisher's exact test, and χ^2 test for trend when appropriate (with 1 df unless otherwise stated). Relative risks and the associated 95% confidence intervals were also calculated. For stratified analyses the Mantel-Haenszel summary χ^2 and summary relative risks were calculated.

Results

Participation—All 279 (100%) obstetric units responded to at least three of our four requests for information. Ninety five per cent (265) of hospitals responded to all four requests, and there were no significant differences in the response rates from individual countries.

Outcome of notifications—Nine hundred and twenty forms with notifications were received detailing 582 individual cases. Figure 1 shows the outcome of the 582 notifications. Sixty cases reported by midwives were deemed inappropriate by consultants, but otherwise notifications from both sources agreed. Three hundred and eighty three cases were included as eclampsia, and in 49% (189) of these we had received more than one notification of the case. The lower part of figure 1 shows the completeness of data collection.

Ascertainment—Confirmed cases were compared with those registered in the Cardiff births survey, in the North West Thames regional database, in the Scottish Information and Statistics Division maternity data, and with the Department of Health's register of maternal deaths. In each comparison we have recorded a greater number of cases than the existing database system.



* Consultants concerned thought notification inappropriate either because no convulsion had occurred or because it was fully explained by diagnosis other than eclampsia

FIG 1—*Outcome of notifications and completeness of data collection*

Incidence—There were 774436 maternities in the United Kingdom during 1992 and 383 confirmed cases of eclampsia, which gives an incidence of 4·9/10000 maternities (95% confidence interval 4·5 to 5·4) (table I). The incidence in the individual regional health authorities of England varied from 3·4/10000 to 7·6/10000, but the differences were not significant.

Risk factors—Teenagers were three times more likely to suffer eclampsia than were older women (relative risk (95% confidence interval) 3·0 (2·4 to 4·0)) (table I). Women with multiple pregnancies were also significantly more susceptible (table I), with a relative risk of 6·0 (4·1 to 8·9). No increase was detected in women over the age of 34 years. Twenty six (27%) of the 96 women with previous viable pregnancies had a history of pre-eclampsia, and one had a history of eclampsia. Thus 18% (70) of all cases were parous women with no previous history of pre-eclampsia or eclampsia.

Antenatal care—Thirteen women (3%) had no antenatal care before the onset of convulsions. Of the remainder it was possible to review the entire record of antenatal visits in 291 (79%) cases. Of these, 206 (71%) had antenatal care corresponding to or exceeding our standard pattern. Eighteen women (6%) booked after 20 weeks, and 67 (23%) had less than the standard frequency of visits. Women with less frequent antenatal visits were not significantly different from those with standard antenatal care in terms of the type of first seizure, where it occurred, or the gestational age at

TABLE I—*Incidence rates of eclampsia in United Kingdom by country, maternal age, and number of fetuses*

Detail	United Kingdom	Country				Maternal age (years)*			Number of fetuses	
		England	Scotland	Wales	Northern Ireland	⩽19	20-34	⩾35	Multiple	Singleton
No of cases of eclampsia	383	307	44	15	17	72	278	33	27	356
No of maternities†	774436	646456	65307	37248	25425	54885	645246	74244	9618	764818
Rate of eclampsia/10000 maternities (95% confidence interval)	4·9 (4·5 to 5·4)	4·7 (4·2 to 5·3)	6·7 (4·6 to 8·7)	4·0 (2·0 to 6·1)	6·7 (3·5 to 9·9)	13·1‡ (10·1 to 16·1)	4·3 (3·8 to 4·8)	4·4 (2·9 to 6·0)	28·1§ (17·5 to 38·6)	4·7 (4·2 to 5·1)

*OPCS population data; maternal age unknown in 61 cases.
†Population data on number of maternities from OPCS VS2 1992, general registrar's office Northern Ireland, and general registrar's office Scotland.
‡χ^2=79·8, df 1, P<0·0001; relative risk (95% confidence interval) 3·0 (2·4 to 4·0) of women <20 years compared with women aged ⩾20 years.
§χ^2 with Yates's correction=100·4, P<0·0001; relative risk (95% confidence interval) 6·0 (4·1 to 8·9) of women with multiple pregnancies compared with those with singleton pregnancies.

which it occurred. Nor were any differences detected in terms of maternal or fetal outcome (data not shown).

Premonitory signs and symptoms—Three hundred and twenty five (85%) women had been seen by a doctor or midwife in the week before their first convulsion. At the time of the last antenatal visit 36 (11%) had no recorded hypertension or proteinuria, 32 (10%) had proteinuria but no hypertension, 71 (22%) had hypertension alone, and 186 (57%) women had both proteinuria and hypertension. Two hundred and ninety four (77%) women were in hospital when eclampsia first occurred, and even in this subgroup only 182 (62%) had established proteinuria and hypertension before the first fit. Sixty four women for whom we had a complete record of antenatal care had their first convulsion while under community based care, and five (8%) of these women had documented proteinuria and hypertension before their first convulsion. Two hundred and twenty seven (59%) women had one or more antecedent symptoms including headaches in 188 (50%), visual disturbances in 72 (19%), and epigastric pain in 71 (19%). Fourteen women (4%) had all three symptoms before convulsing. The maximum blood pressures before the onset of eclampsia were often not dramatically increased: of those who were in hospital the highest recorded diastolic blood pressure before the onset of seizures was 100 mm Hg or less in 100 (34%). In 201 women the blood pressure was measured within one hour of the onset of seizures, and the mean (SD) diastolic blood pressure was 97 (14·6) mm Hg. Very high diastolic blood pressures ($\geq$120 mm Hg) before the onset of convulsions were recorded in only 19% (70) of women overall (23% (69) in women receiving hospital care and 2% (one) in women under community care).

Timing of fit in relation to labour—One hundred and forty seven women (38%) had antepartum eclampsia, 68 women (18%) intrapartum, and 168 (44%) postpartum eclampsia. Twenty (12%) of the postpartum cases occurred more than 48 hours after delivery, three (2%) more than seven days after delivery.

Investigations—Investigations before the onset of eclampsia were not routinely done; in women admitted to hospital with established proteinuria and hypertension only 54% (98/182) had plasma creatinine concentrations measured and 30% (54/182) had plasma transaminase concentrations measured. Even after the onset of eclampsia only 63% (240) of the women had their plasma transaminase concentrations measured.

Maternal outcome—There were seven maternal deaths, giving a maternal case fatality of 1·8% (95% confidence interval 0·7% to 3·7%). In addition to the maternal deaths one woman was left in a persistent vegetative state after a massive cerebrovascular haemorrhage. One hundred and thirty five women (35%) had at least one major complication (table II). The length of hospital stay after eclampsia varied from two days to more than 40 days; 46 (12%) women stayed more than two weeks and 19 (5%) for more than three weeks. One hundred and ninety four (63%) of the 306 women whose general practitioners responded had some documented posteclamptic morbidity. Hypertension was the most common problem (23% (69)), but anxieties about personal health (14% (44)), future pregnancies (14% (44)), headaches (12% (37)), and depression (10% (29)) were also common.

Fetal and infant outcome—There were 411 fetuses; 356 singletons, 26 twins, and one set of triplets. All but one of the fetuses were weighed at delivery: 35 (9%) weighed 1000 g or less and 44 (11%) weighed between 1001 and 1500 g. Of the 356 singletons, 100 (28%) were small for gestational age. Thirty fetal and infant deaths were reported. Five of these were intrauterine deaths in women who were delivered between 20 and 24 weeks' gestation because of worsening maternal condition. There were nine stillbirths in fetuses over 24 weeks' gestation (stillbirth rate 22·2/1000; 95% confidence interval 10·2 to 41·7), and 13 infants died in the neonatal period (neonatal mortality 32·0/1000 (17·2 to 54·1)). In addition, three deaths were reported from complications of prematurity in infants aged more than 4 weeks. All of the deaths were among singletons, most (80% (24)) weighing less than 1500 g at delivery.

TABLE II—*Major maternal complications in eclampsia recorded in hospital case notes*

Major maternal complications	No of cases (n=382)*	% Of cases
Death	7	1·8
Persistent vegetative state	1	<1
Cardiac arrest	6 (4)	1·6
Cerebrovascular accident	7 (1)	1·8
Adult respiratory distress syndrome	7 (3)	1·8
HELLP†	27 (2)	7
Disseminated intravascular coagulopathy (other than HELLP)	33 (3)	9
Pulmonary oedema	18	5
Mendleson's syndrome	4 (1)	1·0
Renal failure	24 (4)	6
Pulmonary embolus	5	1·3
Septicaemia	2 (1)	<1
Cortical blindness (transient)	2	<1
Required ventilation	87 (6)	23

*Figures in parentheses are complications suffered in the seven fatal cases of eclampsia.
†HELLP = Haemolysis, elevated liver enzymes, and low platelets syndrome.

FURTHER ANALYSES

It has been previously suggested that preterm eclampsia has more serious maternal and fetal consequences than eclampsia at term[7] and that eclampsia is less severe when it develops postpartum.[8] To test these hypotheses we analysed in more detail the type of convulsion (antepartum, intrapartum, or postpartum) and the gestational age at which the crisis occurred.

Type of eclampsia and gestational maturity— Almost half (44% (169)) of the cases presented preterm (before 37 completed weeks of gestation), and over a fifth (21% (81)) developed before 31 weeks. The type of eclampsia was closely associated with gestational maturity (fig 2).

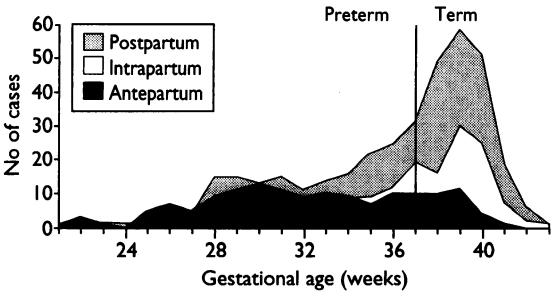


FIG 2—*Number of cases of eclampsia by gestational age at first seizure. For postpartum convulsions gestational age at first seizure taken as gestational age at delivery*

Most of the antepartum convulsions (76%; 111/147) occurred preterm; most of those that were intrapartum or postpartum (75%; 178/236) presented at term. We compared antepartum with intrapartum and postpartum eclampsia. Antepartum eclampsia was more often associated with prodromal symptoms (relative risk 1·23 (1·04 to 1·47)) and less often with prodromal signs (relative risk 0·87 (0·78 to 0·96)). Antepartum cases were in some respects more severe than those occurring at or after delivery: there were significantly more cases with multiple convulsions, major maternal complications, small for gestational age fetuses, and a significantly higher neonatal mortality. Table III summarises the details. Preterm and term cases were also compared. Maternal age, parity, and the number of antenatal visits were similar in the preterm and term groups (data not shown). Women with preterm eclampsia were more severely affected than those presenting at or after term (table IV). Given the close

TABLE III—*Summary of differences between antepartum eclampsia and intrapartum and postpartum eclampsia*

Factor of interest	No (%) of antepartum cases (n=147)	No (%) of intrapartum and postpartum cases (n=236)	Relative risk* (95% confidence interval)	Summary relative risk* with stratified analysis (corrected for gestation of fit) (95% confidence interval)
Prodromal symptoms	107 (75)	120 (51)	1·48 (1·26 to 1·73)	1·23 (1·04 to 1·47)
Prodromal signs (325 seen within past seven days)	76 (83)	213 (91)	0·90 (0·82 to 1·00)	0·87 (0·78 to 0·96)
Preterm seizures	111 (76)	58 (25)	3·07 (2·41 to 3·91)	NA
Seizure outside hospital	82 (56)	6 (3)	22·09 (9·90 to 49·30)	36·24 (9·43 to 139·36)
Multiple seizures	78 (54)	80 (34)	1·59 (1·26 to 2·00)	1·52 (1·15 to 1·99)
Delivered by caesarean section	135 (92)	71 (30)	3·05 (2·50 to 3·73)	2·29 (1·90 to 2·76)
Major maternal complication	74 (51)	61 (26)	1·96 (1·50 to 2·57)	1·63 (1·21 to 2·19)
Maternal death	3 (2)	4 (2)	1·20 (0·27 to 5·30)	NA
Small for gestational age	62 (44)	38 (18)	2·42 (1·72 to 3·42)	6·25 (0·87 to 1·79)
Stillbirth rate	5 (3)	4 (2)	2·27 (0·62 to 8·34)	NA
Neonatal mortality	12 (9)	1 (<1)	22·27 (2·93 to 169·52)	29·18 (0·60 to 1424·68)

NSD=No significant difference. NA=Not applicable. *Relative risk of factor for woman with antepartum eclampsia.

TABLE IV—*Summary of differences between preterm and term eclampsia*

Factor of interest	No (%) of preterm cases (n=169)	No (%) of term cases (n=214)	Relative risk* (95% confidence interval)	Summary relative risk* with stratified analysis (corrected for type of seizure) (95% confidence interval)
Prodromal symptoms	124 (76)	103 (48)	1·58 (1·34 to 1·86)	1·42 (1·18 to 1·71)
Prodromal signs (325 seen within past seven days)	113 (90)	176 (88)	1·03 (0·95 to 1·11)	NA
Antepartum seizures	111 (66)	36 (17)	3·90 (2·84 to 5·36)	NA
Seizure outside hospital	65 (38)	23 (11)	3·60 (2·34 to 5·54)	1·12 (0·76 to 1·65)
Multiple seizures	81 (49)	77 (36)	1·35 (1·06 to 1·71)	1·10 (0·83 to 1·44)
Delivered by caesarean section	134 (79)	72 (34)	2·36 (1·92 to 2·89)	1·43 (1·22 to 1·67)
Major maternal complication	79 (47)	56 (26)	1·80 (1·36 to 2·37)	1·38 (1·02 to 1·85)
Maternal death	4 (2)	3 (1)	1·69 (0·38 to 7·44)	NA
Small for gestational age	78 (50)	22 (11)	4·53 (2·96 to 6·92)	4·18 (2·49 to 7·03)
Stillbirth rate	8 (5)	1 (<1)	10·45 (1·32 to 82·82)	13·27 (0·91 to 193·31)
Neonatal mortality	12 (7)	1 (<1)	16·36 (2·15 to 124·58)	12·49 (0·40 to 394·03)

NSD=No significant difference. NA=Not applicable. *Relative risk of factor for woman with preterm eclampsia.

relation between type of eclampsia and gestational age at presentation, stratified analyses were performed to determine which factors were independently associated. Multiple seizures were associated with antepartum eclampsia but not with gestational immaturity, whereas small for gestational age fetuses were associated with gestational immaturity but not the type of eclampsia. The presence of prodromal symptoms, one or more major maternal complications, and delivery by caesarean section were associated independently with both preterm and antepartum eclampsia (tables III and IV).

Discussion

This is the first comprehensive study of eclampsia in the United Kingdom. The total ascertainment together with the completeness of the data collection on maternal death mean that the incidence rates and maternal case fatalities for eclampsia are likely to be accurate.

The incidence of 4·9/10 000 is similar to that reported for the United States (4·3/10 000 in 1983-6)[9] but higher than that in Sweden (2·7/10 000 in 1980[7]). Our inclusion criteria were similar to those used in the American study[9] whereas the Swedish criteria were broader. Thus, the difference in incidence between Sweden and the two other countries may be greater.

DECLINING INCIDENCE

The incidence of eclampsia in the United Kingdom has declined since 1922 (when the rate was 80/10 000[3]), but the evidence for any substantial decrease in the past 30 years is less compelling. Analysis of regional incidences suggests that there has been little if any improvement over the past two decades. There were 5·3 cases per 10 000 deliveries among residents of South Glamorgan in 1965-74[10] compared with 4·0/10 000 maternities for all of Wales in this study. In the Grampian region of Scotland in 1978-83 the rate was 8/10 000[11] compared with our data for the whole of Scotland of 6·7/10 000. Criteria for eclampsia were not explicitly stated in the above studies, but from the limited information provided it is clear that we would have excluded some of their cases.

In New Zealand eclampsia was a notifiable disease for many years, and its incidence declined from 32/10 000 to 8/10 000 between 1928-33 and 1956-8[12]—a reduction Corkhill attributed to the advent of routine screening for early signs of pre-eclampsia.[12] The reduction in incidence in the United Kingdom between the 1920s and 1970s also occurred as antenatal care became universally available. This, together with the fact that countries without effective antenatal screening programmes still have much higher incidence rates,[13-15] provides circumstantial evidence to support Corkhill's hypothesis.

Most cases in this series, however, occurred despite a normal frequency of antenatal assessments (70%) and even after admission to hospital (77%). Furthermore, eclampsia was often (38%) unheralded by hypertension and proteinuria, even in women in hospital, so it is not surprising that the convulsions could not be prevented. Unheralded eclampsia has been noted before but in proportionally fewer cases (about one in six).[16,17]

Corkhill's hypothesis and our findings are compatible. Screening by measurement of blood pressure and analysis of urine may prevent most eclampsia preceded by hypertension and proteinuria (evidenced by the reduction in incidence in the United Kingdom between 1922 and 1970). As eclampsia with a classic presentation is prevented, however, atypical presentations become a proportionately greater problem (hence the relatively stable incidence since the 1970s and the clinical findings in this study).

The implications are that to achieve further substantial reductions in the incidence of eclampsia we need to develop new screening and diagnostic tests for features other than hypertension and proteinuria. Meanwhile, the development of more effective management should help to reduce the impact and complications of eclampsia when it does occur. The

multicentre trial currently being analysed should provide some soundly based guidance on treatment for eclampsia.[18]

SECONDARY PREVENTION

Our study has measured the maternal case fatality of eclampsia in the United Kingdom for the first time. The figure of just under one in 50 shows that eclampsia is still a marker of an extremely dangerous disorder. It is not, however, the convulsions themselves that are hazardous (idiopathic epilepsy has a much lower case fatality) but the severity of the underlying disturbances. Therefore the focus of secondary prevention should not be simply to prevent convulsions in a desperate situation but to prevent the dangerous state itself.

Hypertension and proteinuria are not the only nor necessarily the most important signs of pre-eclampsia.[1 19] Renal function tests, thrombocytopenia, and abnormal plasma concentrations of liver enzymes give important information about the extent to which the maternal system is affected. Monitoring these indices can give early warning of impending decompensations such as the HELLP (haemolysis, elevated liver enzymes and low platelets) syndrome[20] or renal failure, as emphasised in reports of the confidential inquiries into maternal mortality.[2] It was therefore disappointing that biochemical tests were often not done even after the onset of convulsions.

It is important to note that proteinuria was the only premonitory sign in 10% of cases and that one third of women had only mild hypertension before the onset of convulsions. In these cases there were often delays in making a diagnosis, apparently because of the belief that eclampsia "should" be associated with high blood pressures. Eclampsia is still commonly perceived as the end of a linear spectrum that stretches from normal pregnancy, through mild hypertension, proteinuric pre-eclampsia, and finally eclampsia, so that convulsions are not expected until the woman has severe hypertension, proteinuria, and symptoms.

An alternative view (consistent with current theories of pathogenesis) is that seizures are one of a range of signs and symptoms caused by widespread endothelial cell damage secondary to an ischaemic placenta.[1] The initial signs and symptoms of the syndrome are therefore dictated by the site and extent of endothelial cell damage and not by a predetermined hierarchy. It is then logical that seizures may precede hypertension or proteinuria. In other words, the term pre-eclampsia is misleading because eclampsia can precede pre-eclampsia. Furthermore, just as hypertension may be the only manifestation of the pre-eclampsia syndrome, seizures may occur without other signs and still be a marker of the same underlying pathological process.

CONCLUSIONS

In conclusion, eclampsia complicates nearly one in 2000 pregnancies in the United Kingdom; nearly one in 50 affected women die as do one in 14 of their offspring. As the average case load per consultant drops to well below 1000 deliveries a year individual doctors can expect to see this complication too infrequently to acquire competence in its diagnosis and management. It would therefore seem desirable that at least one consultant in every unit takes a special interest in the problem. There is also the need for support from regional centres as outlined in the recent confidential inquiries into maternal deaths.[2 21]

Most eclamptic convulsions occur in hospital, and they may be unheralded by warning signs or symptoms. Preterm and antenatal eclampsia seem to be particularly dangerous. Every obstetric unit would benefit from having a well established protocol for coping with presentations of convulsions in pregnancy to avoid delays in diagnosis and management. Confirmatory signs should be sought assiduously in the first 48 hours after a fit even if there are no features of pre-eclampsia previously. The signs should include disturbances of liver and coagulation function as well as new hypertension and proteinuria. Screening for hypertension and proteinuria has provided a simple and effective way of reducing the dangers of pre-eclampsia and eclampsia in the past, but new methods need to be sought to reduce the impact of the residual problems not detected by these signs.

Clinical implications

- Eclampsia complicates nearly one in 2000 pregnancies in the United Kingdom; nearly one in 50 affected women die of the condition as do one in 14 of their offspring
- Preterm and antenatal eclampsia seem to be particularly dangerous to both mother and fetus
- This study shows that most eclamptic convulsions in the United Kingdom occur in hospital in women who have received antenatal care
- Eclamptic seizures are not always predated by the common warning signs of pre-eclampsia; in particular, women may fit at relatively low diastolic blood pressures
- Every obstetric unit should have a well established protocol for coping with eclampsia to avoid delays in the diagnosis and management

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Midwife managed delivery unit: a randomised controlled comparison with consultant led care

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Abstract

***Objective*—To examine whether intrapartum care and delivery of low risk women in a midwife managed delivery unit differs from that in a consultant led labour ward.**

***Design*—Pragmatic randomised controlled trial. Subjects were randomised in a 2:1 ratio between the midwives unit and the labour ward.**

***Setting*—Aberdeen Maternity Hospital, Grampian.**

***Subjects*—2844 low risk women, as defined by existing booking criteria for general practitioner units in Grampian. 1900 women were randomised to the midwives unit and 944 to the labour ward.**

***Main outcome measures*—Maternal and perinatal morbidity.**

***Results*—Of the women randomised to the midwives unit, 647 (34%) were transferred to the labour ward antepartum, 303 (16%) were transferred intrapartum, and 80 (4%) were lost to follow up. 870 women (46%) were delivered in the midwives unit. Primigravid women (255/596, 43%) were significantly more likely to be transferred intrapartum than multigravid women (48/577, 8%). Significant differences between the midwives unit and labour ward were found in monitoring, fetal distress, analgesia, mobility, and use of episiotomy. There were no significant differences in mode of delivery or fetal outcome.**

***Conclusions*—Midwife managed intrapartum care for low risk women results in more mobility and less intervention with no increase in neonatal morbidity. However, the high rate of transfer shows that antenatal criteria are unable to determine who will remain at low risk throughout pregnancy and labour.**

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Introduction

If women are to have choice in the location for their delivery, the maternity services must provide a safe and acceptable range of options. In Aberdeen we have developed a midwife managed delivery unit that aims to offer women choice, participation, and control in their labour. Over the past 40 years in Britain women have had less choice as the proportion of babies delivered in consultant maternity units has increased and maternity services have moved away from community based delivery. It has been argued that hospital delivery provides greater safety for mother and baby[1-3] but some researchers disagree.[4]

This debate on the place of delivery and its safety is not new, but it has intensified in the past two years with the publication of recent reports and policy documents.[5-7] Most would agree that close supervision and monitoring of high risk pregnancies is beneficial. However, the application of the same criteria to low risk pregnancies has been questioned. There is some evidence to suggest that there is more intervention in labour and greater maternal morbidity if a low risk woman is cared for in a consultant maternity unit rather than in a general practitioner unit[8-14] or by midwives in a birth room.[15-17] Yet in many of these studies the sample populations have been small or not directly comparable. In all but three of the studies[15-17] selection bias may have been introduced due to preference for a particular type of care. The experience of the family birthing unit in Melbourne showed that intrapartum problems do occur in low risk women,[15] thus highlighting the importance of the close proximity of specialist obstetric, anaesthetic, and neonatal services. Further evaluation of alternative methods of obstetric care, in particular midwife managed care, is required. In this paper we report the results of one such evaluation of a midwifery managed delivery unit in the Aberdeen Maternity Hospital.

Methods

BACKGROUND

The midwives unit in Aberdeen was established in April 1990. It is a separate unit, of five single rooms, located 20 yards from the consultant led labour ward. The philosophy of care behind the unit is to provide a safe, "homely" environment where women can retain choice and control in the management of their labour. Midwives take total responsibility for the care delivered, thus developing and maintaining their competence. Labour is managed traditionally—the fetal heart rate is monitored with a Pinard stethoscope or hand held Doppler apparatus, active labour is encouraged, and there is minimal intervention. The unit is staffed and run by hospital midwives who work throughout the delivery suite according to clinical need. There is no input to the midwives unit by medical staff. However, the unit caters solely for low risk women and there are strict protocols for booking, admission, and transfer.

STUDY AIMS

The main objective was to compare care and delivery of low risk women in a midwife managed delivery unit with care and delivery in the consultant led labour ward in terms of four sorts of outcomes. As well as maternal and perinatal morbidity, reported here, we looked at the expectations, experiences, and satisfaction of parturient women; the role, experiences, and satisfaction of midwifery staff, and costs of care. These other outcomes will be reported elsewhere.

STUDY POPULATION

Low risk women were identified from general practitioners' referral letters. The exclusion criteria for the